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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/538,216

06/09/2005

Jurriaan Schmitz

NL 021416

1792

24737 7590 03/23/2007

PHILIPS INTELLECTUAL PROPERTY & STANDARDS

P.O. BOX 3001

BRIARCLIFF MANOR, NY 10510

EXAMINER

BERNSTEIN, ALLISON

ART UNIT

PAPER NUMBER

2824

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/23/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/538,216

Applicant(s)

SCHMITZ ET AL.

Examiner

Allison Bernstein

Art Unit

2824

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-6 is/are allowed.
- 6) ☒ Claim(s) 7 is/are rejected.
- 7) ☒ Claim(s) 8-12 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/30/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☒ Other: Search History

DETAILED ACTION

Claims 1-12 are pending in the application.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

Acknowledgment is made of applicant's Information Disclosure Statement (IDS), Form PTO-1449, filed 30 May 2006. The information therein was considered.

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the

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applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

On page 4 line 20, "the drift region 2" should be replaced with --substrate 2--.

On page 7 line 5, "the drain 24" should be replaced with --the drain 4--.

Appropriate correction is required.

Claim Objections

Claim 7 is objected to because of the following informalities:

In line 5, "highly doped layer" should be replaced with --highly doped drain layer-- according to line 3 of claim 7.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Naoki (JP 09181311) in view of Tetsuo et al. (JP 55133574).

3. **Regarding claim 7**, Naoki discloses, in figure 5, a semiconductor device, comprising: a semiconductor body having opposed first and second major surfaces, the semiconductor body having a highly doped drain layer (2) of a first conductivity type and lower doped body layer (3) on the highly doped drain layer (2) facing the first major surface; a trench (5) extending into the semiconductor body from the first major surface defining opposed sidewalls and a base; a source region (4) of the first conductivity type laterally adjacent to the trench (5) at the first major surface; a gate dielectric (6) on the sidewalls and base of the trench; opposed gate elements (12) on the sidewalls of the trench but not on the base of the trench; an insulating filler (8) extending upwards from the base of the trench between the gate elements.

4. Naoki does not disclose a gate electrical connection layer at the top of the trench above the insulating filler, the gate electrical connection layer connecting the gate elements across the trench.

5. Tetsuo et al. disclose, in figure 2, a gate electrical connection connecting gate elements (8) on sidewalls of a trench.

6. At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the device of Naoki with a gate electrical connection in view of

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the teachings of Tetsuo et al. since it is necessary for the gate to have a connection in order for the device to function.

Allowable Subject Matter

7. **Claims 1-6** are allowed.

8. **Claims 8-12** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

10. **Regarding claim 1**, the prior art of record fails to teach or suggest the claimed limitations in combination, namely, filling dielectric into the trench between the sidewalls; and forming a gate electrical connection layer across the top of the trench electrically connection the gate material layer across the trench. **Claims 2-6** are dependent on claim 1.

11. **Regarding claim 8**, the prior art of record fails to teach or suggest the claimed limitations in combination, namely, wherein the gate electrical connection layer extends across the top of the trench above the filler. **Claims 9-10** are dependent on claim 8.

12. **Regarding claim 11**, the prior art of record fails to teach or suggest the claimed limitations in combination, namely, a gate-source dielectric isolation layer and a source conducting layer.

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13. **Regarding claim 12**, the prior art of record fails to teach or suggest the claimed limitations in combination, namely, a dielectric plug at the base of the trench.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yang (US 5,258,634), Alsmeier et al. (US 6,593,613), and Yoo (US 6,744,097) are cited to teach sidewall gate electrodes.

When responding to this office action, applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner in locating appropriate paragraphs.

A shortened statutory period for response to this action is set to expire three months and zero days from the date of this letter. Failure to respond within the period for response will cause this application to become abandoned (see MPEP 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allison Bernstein whose telephone number is 571-272-9011. The examiner can normally be reached on Monday-Friday 7AM-4PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

APB


ANH PHUNG
PRIMARY EXAMINER